NEW AND NOTEWORTHY RECORDS OF SEVERAL NON-NATIVE VASCULAR PLANT SPECIES IN ARKANSAS

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ABSTRACT

Collections of nine species of vascular plants, all non-native to the United States, are reported as new or noteworthy for Arkansas. Three species, *Marsilea quadrifolia*, *Pennisetum setaceum*, and *Thunbergia alata*, are reported as new to Arkansas. *Amaranthus blitum* and *Chamaesyce ophthalmica* are reported for their second occurrence in Arkansas. An additional county record for each of three federally listed invasive species is reported: *Eichhornia crassipes*, *Hydrilla verticillata*, and *Myriophyllum spicatum*. The current known distribution of *Quercus acutissima* in Arkansas is provided. Finally, some instances of localized reproductive spontaneity originating from cultivated plants are reported. These include: *Acer palmatum* (Japanese maple), *Camellia japonica*, (common camellia), *Camellia sasanqua* (fall-flowering camellia, *Loropetalum chinense* (fringe flower), *Raphiolepis indica* (Indian hawthorn), and *Ternstroemia gymnanthera* (cleyera); all of which were previously undocumented in Arkansas in this condition.

RESUMEN

Se citan como nuevas o reseñables las colecciones de nueve especies de plantas vasculares, todas ellas no-nativas de los Estados Unidos, para Arkansas. Tres especies, *Marsilea quadrifolia*, *Pennisetum setaceum*, y *Thunbergia alata*, se citan como nuevas para Arkansas. *Amaranthus blitum* y *Chamaesyce ophthalmica* se citan por segunda vez en Arkansas. Se da una cita adicional para un condado de tres especies de la lista federal de especies invasoras: *Eichhornia crassipes*, *Hydrilla verticillata*, y *Myriophyllum spicatum*. Se aporta la distribución actual de *Quercus acutissima* en Arkansas. Finalmente, se citan algunos ejemplos de reproducción espontánea de plantas cultivadas. Estas incluyen: *Acer palmatum* (arce japonés), *Camellia japonica*, (camelia común), *Camellia sasanqua* (camelia de otoño), *Loropetalum chinense* (flor de flecos), *Raphiolepis indica* (espino indio), y *Ternstroemia gymnanthera* (cleyera); que no estaban documentados en Arkansas en esta condición.

INTRODUCTION

Non-native species are continually introduced into the United States through both accidental and intentional human activities. These introductions sometimes lead to the formation of spontaneous populations of these plants. Spontaneous is here defined as the autonomous occurrence through sexual or asexual reproduction of a non-native plant species in a region or flora to which it is not native. It is equivalent to the term "escaped" as defined by Nesom (2000). Most non-native species subsequent to introduction do not successfully establish, or if establishment occurs, do not pose a serious threat to native plant species or ecosystems (Williamson 1996). However, some of these introduced species become invasive, and sometimes sufficiently so to reduce native biodiversity. It is therefore important to record first encounters with escaped populations and monitor these new spontaneous occurrences of non-native species to evaluate their potential for becoming the next wave of invasive species (Yatskievych & Raveill 2001). At present, non-native species comprise approximately 21% of the Arkansas flora (Arkansas Vascular Flora Committee 2006), with 3% annotated as invasive in Arkansas.

Our field work focusing on ruderals and recent escapes in urban environments has led to the recognition of many non-native plant species being documented as new to Arkansas (Peck 2003; Peck & Serviss 2006; Serviss et al. 2006, 2007a, 2007b), with many of the species locally well established when discovered. At present, more species are being documented as entering the Arkansas flora than are being lost from habitat loss, fragmentation, or human disturbance. Additionally, we have observed numerous instances of localized reproductive spontaneity in several species of non-native ornamental shrubs, and while the parent plants were cultivated, substantial reproduction of offspring was documented in the local vicinity of these plants (see end of paper for specimen data).

The national occurrence and distribution of the below listed taxa was determined from the national flora database kept by NRCS (1999).

SPECIES NEW OR NOTEWORTHY FOR ARKANSAS

Amaranthus blitum L. (Amaranthaceae). Purple amaranth is a ruderal species that is native to the Mediterranean region. It occurs across the coastal states from Massachusetts south to Florida, and west to Louisiana and Texas. This is only the second record for *A. blitum* in Arkansas; it was previously documented in Pulaski County (Peck & Serviss 2006).

Voucher specimens: **Clark Co.:** several reproductively mature plants as weeds in flower bed, Lake DeGray Visitor Center, Lake DeGray State Park, 28 Oct 2007, *Serviss 7344* (HEND); urban ruderal habitat, Arkadelphia, Henderson State University campus, 25 Aug 2004, *Serviss 6124* (HEND).

Chamaesyce ophthalmica (Pers.) D.G. Burch (Euphorbiaceae). Florida hammock sandmat is an annual ruderal species that is native to the Gulf coast from Florida and Georgia west to Louisiana. This is only the second record for *C. ophthalmica* in Arkansas; it was previously documented in Pulaski County (Peck & Serviss 2006).

Voucher specimen: **Clark Co.:** several reproductively mature plants as weeds in flower bed, Lake DeGray Visitor Center, Lake DeGray State Park, 28 Oct 2007, *Serviss 7345* (HEND).

Eichhornia crassipes (Mart.) Solms (Pontederiaceae). Water hyacinth, which is native to Brazil, is an aggressive and invasive non-indigenous aquatic species in North America. It was reported as present and then eradicated twice in Arkansas, once as an escape in southeastern Arkansas and once in southwestern Arkansas (Tumlison & Serviss 2006). It is here reported as a persisting and spreading population at its most northerly location yet in Arkansas, at the junction of the Little Maumelle River and the Arkansas River in Pulaski County, Arkansas. Here it co-occurred with *Egeria densa*, *Hydrilla verticillata*, *Marsilea quadrifolia*, and *Myriophyllum spicatum*. It was first discovered at this location in 2006 by Bob Spraggins, an accountant for the Arkansas Natural Heritage Commission, who brought it to the attention of Theo Witsell, staff botanist of the same agency. In 2007 the locality was searched, and all five invasive species were noted as unchecked and spreading.

Voucher specimen: **Pulaski Co.:** a floating-plant emergent spreading along 4 km of swamp, slough, and shore habitats of the lower Little Maumelle River, 16 Jul 2007, Peck *07-1352* (LRU).

Hydrilla verticillata (L.f.) Royle (Hydrocharitaceae). Water-thyme is an aggressive and invasive non-indigenous aquatic species that is native to Asia. It was reported as present in several impoundments of tributary rivers to the Arkansas River (Peck 2003; Peck & Serviss 2006), and here for the first time in Pulaski County, at its most northerly location yet in Arkansas, at the junction of the Little Maumelle River and the Arkansas River. Here it co-occurred with *Egeria densa*, *Eichhornia crassipes*, *Marsilea quadrifolia*, and *Myriophyllum spicatum*. It was discovered at this location in 2007 with four other invasive species and was noted as unchecked and spreading. As it is known to survive multiple winters as far north as Iowa (Peck & Smart 1986), it might also be found in northern Arkansas impoundments.

Voucher specimen: **Pulaski Co.:** a submerged aquatic plant spreading along four km of swamp, slough, and shore habitats of the lower Little Maumelle River, 16 Jul 2007, *Peck 07-1358* (LRU).

Marsilea quadrifolia L. (Marsileaceae). European Waterclover is native to Europe and Asia, and is an aggressive and invasive non-indigenous aquatic species. It was introduced into eastern North America as an aquarium plant, and has since escaped and spread westward as far as southwestern Iowa. It is reported for the first time from Arkansas, where it was found along a muddy shore of the Little Maumelle River, Pulaski County, Arkansas. The patch was relatively small, suggestive of a recent introduction, most likely by transient waterfowl. It was associated with extensive growths of other non-native and invasive species: *Eichhornia crassipes*, *Egeria densa*, *Hydrilla verticillata*, and *Myriophyllum spicatum*.

Voucher specimen: **Pulaski Co.:** a single patch of floating-leaf shoreline plant spreading along muddy, disturbed shore habitat of the Little Maumelle River near Pinnacle Valley Bridge two km upstream of the mouth of the Little Maumelle River at the Arkansas River, 16 Jul 2007, *Peck 07-1514* (LRU).

Myriophyllum spicatum L. (Haloragaceae). Eurasian water milfoil is an aggressive and invasive non-indigenous aquatic species that is native to Europe and Asia. It is reported for the first time in Pulaski County, at the junction of the Little Maumelle River and the Arkansas River. Here it co-occurred with *Eichhornia crassipes*, *Egeria densa*, *Hydrilla verticillata*, and *Marsilea quadrifolia*.

Voucher specimen: **Pulaski Co.:** a submerged plant spreading along shore habitats along four km of the Little Maumelle River down to Twin Rivers County Park at the mouth of the Little Maumelle River at the Arkansas River, 9 Jul 2007, *Peck 07-1635* (LRU).

Pennisetum setaceum (Forsk.) Chiov. (Poaceae). Fountain grass is a caespitose, perennial grass that is native to Africa. This is the first documentation of this species in Arkansas outside of cultivation. It has been previously documented outside of cultivation in Arizona, California, Colorado, Florida, Hawaii, Louisiana, New Mexico, Oregon, and Tennessee.

Voucher specimen: **Clark Co.:** a few spontaneous plants growing as weeds in a shrub planting on the Henderson State University campus; the origin of the population is not known, and it did not persist for more than a couple of years, Arkadelphia, 24 Sep 2004, *Serviss 6636A* (HEND).

Quercus acutissima Carruthers (Fagaceae). Sawtooth oak is native to Korea, China, Japan, and Vietnam. It has been documented outside of cultivation in several states, including Alabama, Georgia, Louisiana, Maryland, North Carolina, Mississippi, Pennsylvania, and Virginia. Though previously documented as present in the Arkansas flora (Arkansas Vascular Flora Committee 2006); specifically, it has been documented outside of cultivation in 10 Arkansas counties (Cross, Drew, Hempstead, Jackson, Jefferson, Lincoln, Nevada, Pike, Union, and most recently, Clark). Sawtooth oak has demonstrated the ability to escape cultivation and subsequently naturalize in many areas of the eastern U.S., especially when cultivated plants are in the vicinity of open areas, such as grasslands and disturbed woods (Whittemore 2004). Hence, it appears to have the potential to become invasive in Arkansas, and its current known distribution in the state seems worthy of note.

Voucher specimen: **Clark Co.:** seven, spontaneous, juvenile plants growing around and under cultivated shrubs; a cultivated *Q. acutissima* tree was present some distance from the vicinity of the spontaneous juveniles, and it is possibly the parent, Arkadelphia, Ouachita Baptist University campus, 31 Oct 2007, *Serviss 7342* (HEND).

Thunbergia alata Bojer ex Sims (Acanthaceae). Blackeyed susan vine is native to Tropical Africa, but has become a pantropical weed. *Thunbergia alata* is currently only known outside of cultivation in the U.S. from Florida, Hawaii, and Texas. One spontaneous plant has been documented in Arkansas. This is the first documentation of this species in Arkansas outside of cultivation.

Voucher specimen: **Clark Co.:** a single, reproductive plant located in a somewhat unkempt lawn area of a home site, Arkadelphia, 420 Cedar Grove Road, 5 Sep 2004, *Serviss 6628* (HEND); one of the authors (BES) has known the homeowner at this location for several years, and during that time no material of *T. alata* has been present, cultivated or otherwise, on the homeowner's property.

ADDITIONAL NOTEWORTHY SPECIES

The following six non-native, woody, angiosperms were documented as spontaneous offspring in the immediate vicinity, or within a short (several meters) distance from the vicinity of cultivated and reproductive individuals of these species. Documentation of these initial reproductive successes by cultivated non-native plants is essential for dating their initial entrance into the flora by other than the direct assistance of human activities. Additionally, the ability of these species to successfully reproduce offspring is significant in that probably with regard to most of the non-native and invasive ornamentals in the U.S., their initial "entrance" into the flora was accomplished in similar fashion to the following examples. It is therefore crucial to recognize and subsequently document these initial occurrences of spontaneity in non-native plant species. All six of the following species have displayed successful reproduction in Arkansas, evidenced by the presence

of few to many spontaneous juveniles being present within a short distance of cultivated reproductive age plants of their respective species.

Specimen data: **Acer palmatum** Thunb. (Sapindaceae). Japanese maple is native to Japan, and has been previously recorded outside of cultivation in Ohio, Pennsylvania, and New York. Voucher specimen: Clark Co.: dozens of seedlings scattered across a few disturbed flower beds in proximity to cultivated plants of *A. palmatum*, Arkadelphia, Ouachita Baptist University campus, 27 Nov 2007, *Serviss 7352* (HEND). **Camellia japonica** L. (Theaceae). Japanese camellia is native to Japan, but has been documented outside of cultivation in Florida, Georgia, and the Carolinas. Voucher specimen: Clark Co.: a few spontaneous plants present beneath a large, cultivated shrub of *C. japonica*, Arkadelphia, Henderson State University campus, 1 Nov 2007, *Serviss 7344* (HEND). **Camellia sasanqua** Thunb. (Theaceae). Fall-flowering camellia is native to Japan. It has been documented outside of cultivation in Florida, Georgia, and the Carolinas. It has been documented in several locations of Clark County by the presence of numerous (more than 100) spontaneous seedlings and juveniles in the vicinity of cultivated *C. sasanqua* plants. Voucher specimens: Clark Co.: several small seedlings and juvenile plants in the vicinity of two reproductive age plants of the species, Arkadelphia, edge of disturbed wooded area off of 12th Street, one block west of the Henderson State University campus, 18 Mar 2005, *Serviss 6861* (HEND); Arkadelphia, Henderson State University campus, 29 May 2005, *Serviss 6985* (HEND). **Loropetalum chinense** (R. Br.) Oliv. (Hamamelidaceae). Fringe flower is native to China. Voucher specimen (two locations located for Clark Co.; one cited below): Clark Co.: several spontaneous seedling and juvenile plants growing in a disturbed area in the vicinity of several cultivated, reproductively mature plants of *L. chinense*, Arkadelphia, Henderson State University campus, Oct 2006, *Serviss 7094* (HEND). **Raphiolepis indica** (L.) Lindl. (Rosaceae). Indian hawthorn is native to China. Arkansas material of this species is represented by numerous spontaneous seedlings in the vicinity of reproductive age plants of the species (present at a couple of locations in Clark County). Voucher specimen: Clark Co.: numerous spontaneous seedlings and slightly larger juveniles in the vicinity of several cultivated, reproductively mature plants of *R. indica*, Arkadelphia, Henderson State University campus, 28 Feb 2007, *Serviss 7115* (HEND). **Ternstroemia gymnanthera** (Wight & Arn.) Sprague (Theaceae). Cleyera is native to India, the Malaysian Peninsula, and Japan. This species is known from Arkansas by only a few spontaneous juvenile plants (one specimen cited below). Spontaneous juvenile plants were found several meters from the vicinity of cultivated reproductive age plants of *T. gymnanthera*. Voucher specimen: Clark Co.: one juvenile plant growing with a variety of other weeds under cultivated shrubbery; cultivated, reproductive age plants of *T. gymnanthera* were present a short distance from the location of the spontaneous juvenile, Arkadelphia, residence adjacent to Henderson Street and 13th Street, 28 Feb 2007, *Serviss 7113* (HEND); circumstantial evidence indicates dispersal by birds (the seeds of *T. gymnanthera* are bird-dispersed).

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